Memorandum

To: *Jennifer LaPoma, EPA Region 2*
Elizabeth Franklin, USACE

From: *David A. Marabello, CDM Smith*
Scott Kirchner, CDM Smith

Date: *March 22, 2016*

Subject: *Summary of Oversight of SPME Sampler Retrieval Effort at River Mile 10.9*
March 8-10, 2016
Lower Passaic River Restoration Project

On behalf of the United States Environmental Protection Agency (EPA) and the United States Army Corps of Engineers (USACE), Kansas City District, CDM Federal Programs Corporation (CDM Smith) traveled to the River Mile (RM) 10.9 removal area on March 8, 9, and 10, 2016. CDM Smith provided field technical oversight of the retrieval of solid-phase microextraction (SPME) samplers that had been installed on December 9, 10, and 11, 2015 at Stations 0601, 0603, 0604, 0605, 0606, 0607, 0607 duplicate, and 0608. These field activities were conducted by AECOM on behalf of the Cooperating Parties Group (CPG).

The SPME samplers retrieved by AECOM during the March 2016 field efforts had been installed as part of a post-construction monitoring event for the RM 10.9 sediment cap. The SPME passive porewater samplers were intended to assess contaminant concentrations in the sediment bed below the cap, in the active cap layer, and in the armor stone layer of the RM 10.9 cap. These samplers were part of an initial performance monitoring event that included SPME sampling at seven out of the ten planned locations along the length of the RM 10.9 cap. Three samplers were installed at each of the seven stations during the December 2015 mobilization, with one set of duplicate samplers installed at Station 0607. The three SPME samplers installed at each location were as follows:

- A deep sampler, installed in the underlying sediment at approximately 36 inches below the mudline
- A mid-depth sampler, installed in the active layer at approximately 24 inches below the mudline
- A shallow sampler, installed in the armor layer at approximately 16 inches below the mudline

Photographs of these March 2016 field activities are presented in Attachment 1. A copy of the field logbook notes is provided in Attachment 2.

Summary of March 8, 2016 Field Activities

Personnel in Attendance

Keegan Roberts – CDM Smith
Yeqing Liu – CDM Smith
Helen Jones – AECOM
Rick Purdy – AECOM
Jennifer Reed – AECOM
Joel Meunier – AECOM
Claire Murphy-Higgin – AECOM
Patrick Felione – AECOM

General Summary

The March 8, 2016 field activities consisted of:

- Collection of five total grab samples of the soft sediments deposited above the cap at Stations 0601, 0605, 0606, 0607, and 0607 duplicate.
- Retrieval of twelve SPME passive samplers from Stations 0601, 0605, 0606, 0607, and 0607 duplicate.
- Processing fibers from six of the retrieved SPME samplers for chemical analyses. The fibers from the remaining six samplers retrieved on March 8th were processed on March 9th.

Sediment Sampling

AECOM collected a grab sample of the soft surface sediments on top of the cap at each sample station prior to retrieving the SPME samplers, as required by the Quality Assurance Project Plan ("QAPP", AECOM 2015). Sediment sampling locations and collection times are noted in Table 1.

Table 1: March 8, 2016 Sediment Sample Summary

Collection Time	Sample Location	Notes
13:16	Station 0607	Sample collected from base of armor layer SPME sampler
13:25	Station 0607 (dup)	Sample collected from base of duplicate armor layer SPME sampler
14:17	Station 0606	Sample collected from base of sediment layer SPME sampler
14:33	Station 0605	Sample collected between sediment layer SPME sampler and active layer SPME sampler
15:24	Station 0601	Sample collected between two unidentified SPME samplers

The aforementioned sediment samples were collected from an interval extending from the surface of the sediments overlying the armor layer to approximately 5 to 6 inches down (i.e., the sample interval was above the armor layer). A stainless steel spoon was used to collect the sediment sample and transfer the sediment sample into amber glass sample jars. The sediments at each location appeared to be very loosely consolidated, with a high water content. The grab sample locations were recorded using a Trimble® Geo 7X handheld Global Positioning System (GPS) device. The

sediment sample collection process lasted approximately 3 minutes for each sample, exclusive of preparation time. Five total sample jars were filled and packaged.

SPME Sampler Retrieval and Sample Processing

The twelve SPME samplers retrieved on March 8th were installed on December 9-11, 2015, or approximately 90 days prior to their retrieval. The SPME samplers were originally planned to be deployed for 60 days. However, due to unfavorable weather conditions, the SPME retrieval was delayed. Eleven of the twelve SPME samplers retrieved on March 8th were either bent or laying in the mudflats above the cap, as noted in Table 2.

Table 2: March 8, 2016 SPME Sample Retrieval Summary

Station Location	Collection Time	Planned Sample Interval	Notes
0607	13:27	Armor Layer	Sampler lying horizontally over cap in mudflat.
	13:30	Underlying Sediment	Sampler lying horizontally over cap in mudflat. Sampler bent at 45 degree angle.
	13:36	Active Layer	Sampler missing identifying flag, but later determined by AECOM to be active layer sampler. Sampler appeared to be at shallower depth than originally installed.
0607 duplicate[1]	13:38	Underlying Sediment	Sampler lying horizontally over cap in mudflat. Bent in V-shape.
	13:43	Armor Layer	Top of sampler is bent but screen appears still buried in cap.
0606[2]	14:20	Underlying Sediment	Sampler appears straight and unbent with screen buried.
0605	14:40	Active Layer	Sampler lying horizontally over cap in mudflat. Bent in V-shape.
	14:43	Underlying Sediment	Top of sampler is bent but screen appears still buried vertically in cap.
	14:47	Armor Layer	Top of sampler is bent but screen appears still buried vertically in cap.
0601	15:24	Armor Layer	Sampler missing identifying flag, but later determined by AECOM to be armor layer sampler based on length and orientation. Sampler bent in a C-shape. Screen appeared buried at a diagonal. Top of sampler is missing Swagelok fitting.
	15:26	Active Layer	Sampler missing identifying flag, but later determined by AECOM to be active layer sampler based on length and orientation. Top of sampler is bent but screen appears still buried vertically in cap.
	15:36	Underlying Sediment	Sampler bent and lying horizontally over cap in mudflat.

A metal rod was driven into one of the three sampler locations at each station following SPME sampler retrieval. These rods will be used to help identify the sample stations during subsequent sampling events.

The samplers were rinsed with Talex water and the screened portion of each sampler was wrapped in aluminum foil following retrieval. The samplers were then processed on shore by AECOM

[1] 0607 Duplicate Active Layer SPME sampler was not located during field efforts.
[2] 0606 Active Layer and Armor Layer SPME samplers were not located during field efforts.

personnel. The general processing steps were as follows: Fibers were removed from the Henry sampler, wiped with a damp Kimwipe™, and rinsed with Talex water over clean aluminum trays. Any tape (used to secure the fibers during deployment) or SPME fibers covered by tape were cut from the exposed fiber portions using an X-ACTO® knife and disposed of. A metal rod was used to push the SPME fibers out from those Henry samplers where the fibers had come loose from the tape and had become lodged in the Henry sampler.

Fibers were retrieved from the aluminum tray with tweezers and placed on a clean piece of aluminum foil. Fibers longer than approximately 13 centimeters (cm) in length were cut into two smaller pieces. Fibers were then measured with a caliber, had their lengths recorded, and were placed in a vial of Talex water. Processing of the SPME samplers generally lasted between 30 to 45 minutes per sampler, depending on the difficulty of fiber extraction. All fiber lengths were measured by H. Jones and recorded by R. Purdy and K. Roberts.

A summary of the retrieved SPME fiber lengths is provided in Table 3. Each sampler was planned to be deployed with nine SPME fibers, each measuring 15 cm (not including the length of the taped fiber portion on each end). However, many fibers broke during deployment or retrieval of the samplers, and in some instances the tape affixing the fibers in the sampler was also lost. In these cases, the field team could not determine which portion of the fiber had been covered by the tape during deployment, so all recovered fibers were processed for analysis. This may be the cause of some fiber recoveries exceeding 135 cm.

Table 3: March 8, 2016 SPME Fiber Length Summary

Start Time of Processing	Sample Location	Measured Fiber Recovery
13:40	Station 0607, Armor Layer	138.4 cm total fiber length recovered
14:07	Station 0607, Armor Layer (dup)	138.8 cm total fiber length recovered
14:45	Station 0607, Underlying Sediment (dup)	152.3 cm total fiber length recovered
15:35	Station 0606, Underlying Sediment	142.6 cm total fiber length recovered
16:15	Station 0607, Active Layer	81.4 cm total fiber length recovered
16:42	Station 0607, Underlying Sediment	142.7 cm total fiber length recovered

cm – centimeter

The remaining six samplers that were collected on March 8th but were not processed the same day were wrapped in foil to be processed the following day. These samplers included Station 0601 armor layer, active layer, and underlying sediment; and Station 0605 armor layer, active layer, and underlying sediment.

Summary of March 9, 2016 Field Activities

Personnel in Attendance

Keegan Roberts – CDM Smith
Yeqing Liu – CDM Smith
Helen Jones – AECOM
Rick Purdy – AECOM
Jennifer Reed – AECOM

Joel Meunier – AECOM
Claire Murphy-Higgin – AECOM
Patrick Felione – AECOM

General Summary

The March 9, 2016 field activities consisted of:

- Collection of three total grab samples of the soft sediments deposited above the cap at Stations 0603, 0604, and 0608.
- Retrieval of seven total SPME passive samplers from Stations 0603, 0604, and 0608.
- Processing fibers from four of the SPME samplers that were retrieved on March 9th
- Processing fibers from six of the SPME samplers that were retrieved on March 8th.

Sediment Sampling

AECOM collected a grab sample of the soft surface sediments on top of the cap at each sample station prior to retrieving the SPME samplers, as required by the QAPP (AECOM 2015). These activities were similar to the sediment sampling conducted on March 8th. Sediment sampling locations and collection times are noted in Table 4.

Table 4: March 9, 2016 Sediment Sample Summary

Collection Time	Sample Location	Notes
14:32	Station 0608	Sample collected between armor layer SPME sampler and active layer SPME sampler. Surface sediment at this location was noted by AECOM personnel to be less than 4 inches thick.
15:03	Station 0604	Sample collected between sediment layer SPME sampler and active layer SPME sampler.
15:27	Station 0603	Sample collected near base of active layer SPME sampler.

Sediment samples were collected in the same manner as described in the summary of March 8, 2016 field activities. Three total sample jars were filled and packaged for shipment.

SPME Sampler Retrieval and Sample Processing

The seven SPME samplers retrieved during the March 9th field effort were installed on December 9-10, 2015, approximately 90 days prior to their retrieval. Five of the seven SPME samplers were bent or laying in the mudflats above the cap, as noted in Table 5. After the samplers identified in Table 5 were retrieved, AECOM personnel returned to Station 0606 with a metal detector to search for missing samplers from 16:20 to 16:40. None of the missing samplers were found.

Table 5: March 9, 2016 SPME Sample Retrieval Summary

Station Location	Collection Time	Planned Sample Interval	Notes
0608	14:34	Armor Layer	Screen appears to be buried in mudflat overlying the cap.
	14:37	Active Layer	Top of screen is bent and appears buried in mudflat or top of armor layer only.
	14:39	Underlying Sediment	Sampler appears straight.
0604[3]	15:05	Underlying Sediment	Sampler appears mostly straight.
	15:08	Active Layer	Sampler is slightly bent halfway down. Screen appears buried at a slight diagonal.
0603[4]	15:29	Active Layer	Sampler bent in a "C"-shape. Screen appeared buried at a diagonal.
	15:33	Armor Layer	Sampler appears mostly straight but lying horizontally out of cap in mudflat.

The general processing steps were the same as described in the summary of March 8, 2016 field activities. Many fibers broke prior to or during retrieval of the samplers. A summary of the length of SPME fibers retrieved is provided in the Table 6.

Table 6: March 9, 2016 SPME Fiber Length Summary

Start Time of Processing	Sample Location	Measured Fiber Recovery
11:26	Station 0601, Underlying Sediment	163.7 cm total fiber length recovered
11:47	Station 0605, Underlying Sediment	87.6 cm total fiber length recovered
12:35	Station 0605, Armor Layer	112.4 cm total fiber length recovered
13:20	Station 0605, Active Layer	102.5 cm total fiber length recovered
14:08	Station 0601, Armor Layer	115.6 cm total fiber length recovered
14:43	Station 0601, Active Layer	123.8 cm total fiber length recovered
15:41	Station 0604, Underlying Sediment	129.5 cm total fiber length recovered
16:13	Station 0604, Active Layer	116.2 cm total fiber length recovered
16:38	Station 0603, Armor Layer[5]	130.3 cm total fiber length recovered
17:30	Station 0608, Underlying Sediment	135.0 cm total fiber length recovered

All fiber lengths were measured by H. Jones and recorded by R. Purdy and K. Roberts.

Summary of March 10, 2016 Field Activities

Personnel in Attendance

Yeqing Liu – CDM Smith
Helen Jones – AECOM

[3] 0604 Armor Layer SPME sampler was not located during field efforts.
[4] 0603 Underlying Sediment Layer SPME sampler was not located during field efforts.
[5] This sampler misidentified as 0603 Underlying Sediment Layer SPME sampler in Roberts' field notes

Rick Purdy – AECOM
Jennifer Reed – AECOM
Joel Meunier – AECOM
Patrick Felione – AECOM (left during first sample processing)

General Summary

The March 10, 2016 field activities consisted of:

- Processing fibers from SPME samplers that were collected on March 9th but not yet processed for chemical analyses.

SPME Sample Processing

Three samplers had been collected on March 9th but were not processed until March 10th. The general processing steps were the same as described in the summary of March 8, 2016 field activities. Many fibers broke prior to or during retrieval of the samplers. A summary of the SPME fiber lengths retrieved is provided in Table 7.

Table 7: March 10, 2016 SPME Fiber Length Summary

Start Time of Processing	Sample Location	Measured Fiber Recovery
9:53	Station 0603, Active Layer	162.3 cm total fiber length recovered
10:30	Station 0608, Armor Layer	110.2 cm total fiber length recovered
11:22	Station 0608, Active Layer	131.5 cm total fiber length recovered
11:46	Field Blank	143.6 cm total fiber length recovered

All fiber lengths were measured by H. Jones and recorded by R. Purdy and Y.Liu. The sample bottles from this day and the previous two days (total 20 vials of fibers) were placed in a cooler along with all sediment sample bottles and bubble wrap. AECOM indicated the air bill for shipment would be printed back at their hotel.

References

AECOM. 2015. Quality Assurance Project Plan, Lower Passaic River Restoration Project, River Mile 10.9 Post-Construction Monitoring – Draft. Rev. 1. December 4.

Attachment 1
Photographs of Field Activities

A selection of photographs from this field effort is provided in this attachment. The complete set of photographs can be found in the file labeled "Passaic_RM10.9_SPME_Retrieval_Photos.zip" in the SharePoint library at:
http://passaic.sharepointspace.com/members/Implementation/Field%20Work/Photos_from_RM10%209_SPME_retrieval_8-10-March-2016.zip

(Please note this file is over 400 megabytes so the download may take some time)

Photograph 1: Sample Processing Tent

3/8/2016

Photograph 2: Surface sediment grab sample collected from Station 0607

3/8/2016

Photograph 3: Underlying Sediment SPME Sampler laying in mudflat at Station 0607

3/8/2016

Photograph 4: Surface sediment sample collection at Station 0606

3/8/2016

Photograph 5: Retrieving SPME samplers from Station 0605

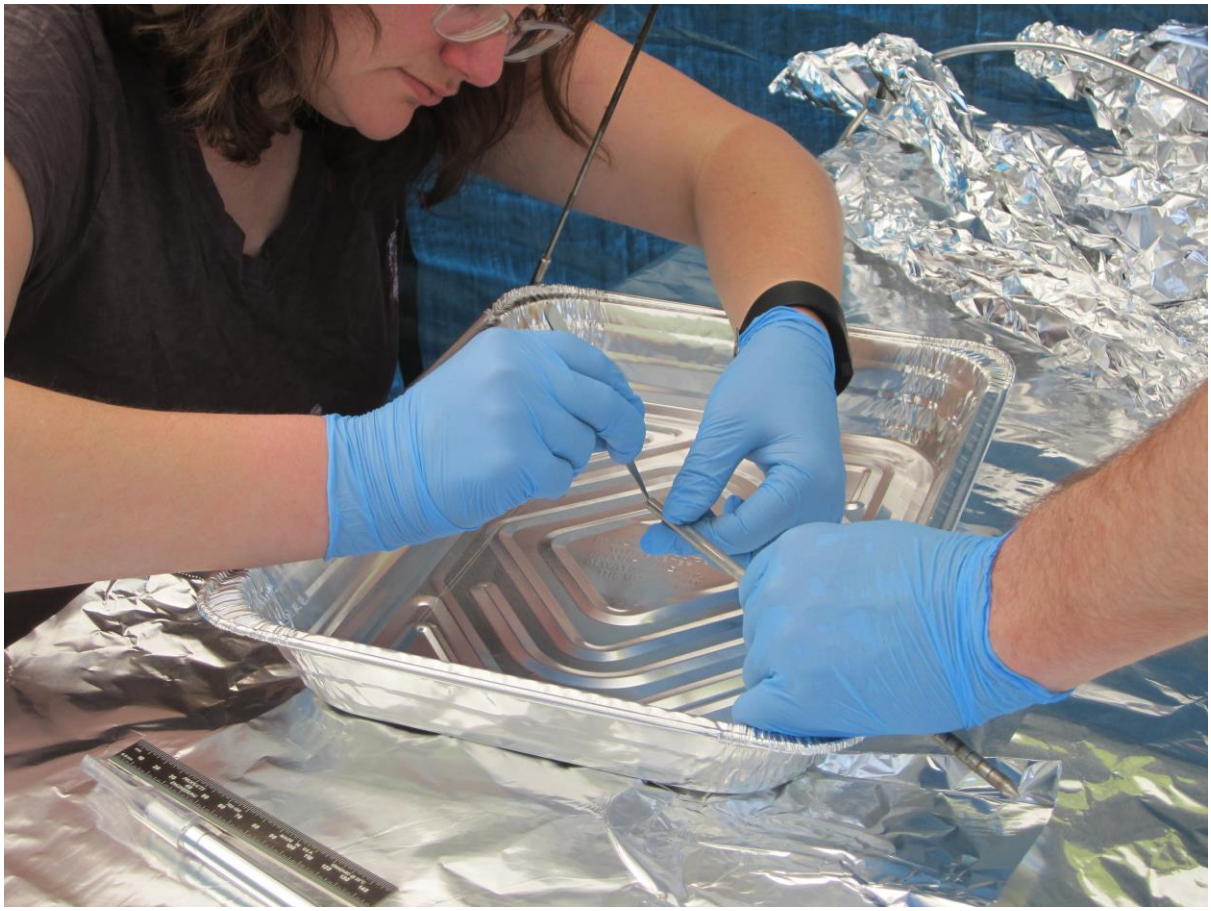
3/8/2016

Photograph 6: Collecting surface sediment sample at Station 0601 (notice bent SPME samplers)

3/8/2016

Photograph 7: Opening 0601 underlying sediment SPME sampler to retrieve fibers

3/9/2016

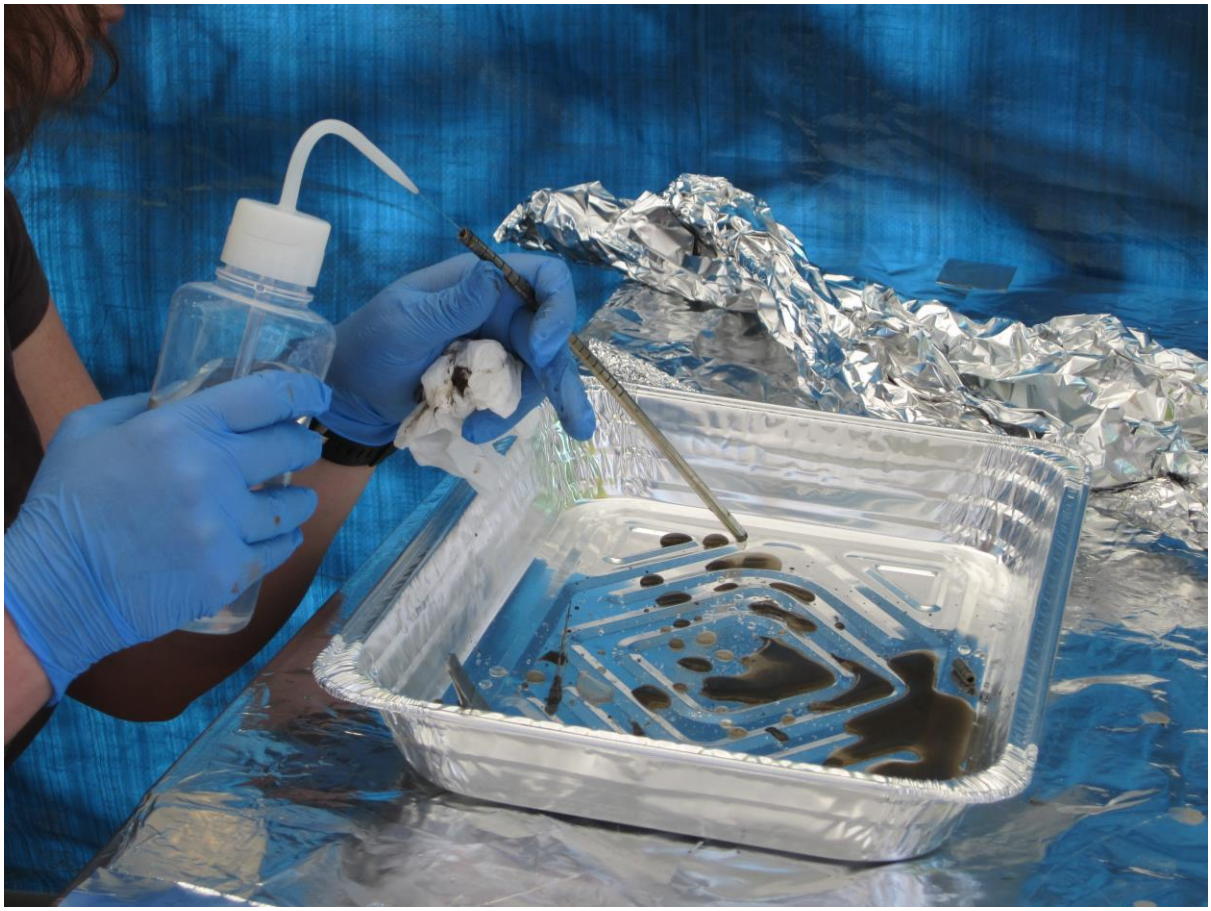


Photograph 8: Extracting SPME fibers with tweezers

3/9/2016

Photograph 9: Measuring SPME fibers with caliper

3/9/2016



Photograph 10: Rinsing 0605 active layer SPME sampler with Talex water

3/9/2016

Photograph 11: Armor Layer and Active Layer SPME Samplers at Station 0608

3/9/2016

Attachment 2
Field Logbook Notes

Location Passaic RM 10.9 Date 3/8/16
Project / Client USEPA

11:00 Arrived Onsite
Refer to logbook maintained by KRoberts for list of people
11:30 Field team begins unpacking & setting up
11:50 2nd field team arrives
1230 Tailgate Meeting H&S
1300 Field team uncovers 3 samplers at field duplicate locations, all samplers horizontal or bent along horizontal 606 607
1308 Field team measuring layers uncovered while ~~text~~ horizontal rod YL 3/8/16
1310 uncovering and ~~starting extracting~~ horizontal red rod
1316 collecting top 6 inches of sediment from base of horiz red rod
1323 measuring layers at base of field duplicate (red)
1325 collecting sediment clip from base of red rod clip
1327 sampler collected pulled straight up ~~horizontally~~ vertically (red rod)

Location Passaic RM 10.9 Date 3/8/16
Project / Client USEPA

1328 green flagged rod is bent at 45 degree angle completely flat in soft sediment
1330 green flagged rod pulled vertically out of sediment
1334 plate pulled out, broke off from rod (unknown)
1336 rod pulled from sediment no flag but 3-4 in on one end bent of green
1338 clip green flagged rod pulled was fully lying in shallow soft sediment bent in V shape - plate missing
1340 unknown rod determined to be a yellow flagged rod
1343 red clip pulled from shallow sediment
1351 plate attached to placeholder rod installed into sampling location
1400 moved to next sampling location 606
1410 measuring sediment & layers
1412 looking for sediment sampling rods
1417 collecting sediment sample from base of green sampling rod

Location Passaic RM 10.9 Date 3/8/16
Project / Client USEPA

YL 3/8/16
~~back at green sampling rod~~ flagged
1420 green flagged rod pulled out
appears to be straight
unbent
1422 placeholder rod installed in
sampling loc w/ plate
1430 next sampling location 605
all 3 sampling rods have been found
Photo 34 green rod sticking out appears
bent 70° angle
yellow rod bent 75°
in a V shape, float in the
1433 soft sediment, extracted
1443 green rod extracted screen appears
still buried in ground straight even though
Photo 35 green flagged rod top is bent
no plate
1447 red rod extracted U shape bend
Photo 36,37 red rod. was vertical bent at top
1450 driving placeholder rod into
ground
1455 break
1520 Next location 601
measuring soft sediment
Photo 40 - sample locat 601

Location Passaic RM 10.9 Date 3/8/16
Project / Client USEPA

1522 both two rods sticking out
don't have flags need to measure
to determine/identify
1524 photos 41-42 sediment sampling
show 2 unidentified rods
1526 one unknown rod pulled
Photo 43-45 (1st unknown rod)
1532 photo 46-48 (2nd unknown rod)
rod pulled from sediment
1534 placeholder rod driven into
ground
1536 green rod pulled from soft/shallow sediment
did not bury any deeper
photos 49-51 = green rod
photo 52 = 2nd unknown rod
photo 53 = all 3 rods
1615 begin decon
1622 leave site End of day

3/8/16
Y.L. Y.

26 Location Passaic RM 10.9 Date 3/9/16
Project / Client USEPA

1020	Arrive onsite
1055	AECOM setting up sampling tent & field team is getting ready Same last group of people as yesterday (3/8/16)
1120	Safety meeting: main concerns are heat stress, hydration, slip trips and falls
1126	601 sediment layer fiber extraction process begins photos 56-57 to 61
1140	fiber measurement readings begin See Roberts log book for measurements
1147	605 fiber extraction process begins (sediment layer) photos 62 - 65 difficulty pulling fibers out seem to be stuck in screen
1236	605 armor layer fiber extraction
1310	Rick evaluated 608 (closest to shore) looks like still 1 ft water, will wait ~1 hour
1324	605 active layer fiber extraction Photo 68-69

Location Passaic RM 10.9 Date 3/9/16 27
Project / Client USEPA

1410	601 unknown #1 determined to be armor layer
1420	field team heads out to sampling loc 608 - TWO of the three are sticking out (red and yellow) green is lying flat in the sediment <4 inches to armor layer Photo 72 (yellow left red right) 11.5 in clay to geotextile very little soft sediment
1432	soft sediment sample collected from between yellow and red rods ~~423~~ XL 3/9/16 Photos 73 & 74 sediment sample
1934	red rod pulled 31 inches to top of plate. Photo 75
1437	yellow rod pulled ~26 inches to top of plate 76 & 77 photos
1939	green rod pulled ~ 48in total length (extension) 41in to top of plate
1441	place holder rod driven into sampling location Photos 81 & 82

Rain on the Rain

28

Location Passaic RM 10.9 Date 3/9/16

Project / Client USEPA

1455	Field team moves to 604
1503	Sediment sample taken two of the 3 rods are sticking out of the ground ~1in
1505	green rod pulled out of ground, was sticking out about 1 inch photo 84
1508	yellow rod pulled out, was sticking ~0 ~3 inches photo 85 photo of red rod found but seems to have been loosened off rod. JL 3/9/16
1510	still probing for ~~3~~ red rod. photo 85-86
1515	placeholder rod driven into ground still can't find red rod
1518	moved to next sample location 603 - probing for rods yellow rod sticking out of the ground bent photos 87-89
1527	sediment sample taken near photos 90-91 base of yellow rod

Location Passaic RM 10.9 Date 3/9/16 29

Project / Client USEPA

1529	yellow rod pulled out of ground (active layer).
1533	red rod pulled straight out of shallow sediment, screen exposed (lying horizontally on ground) photo 94
1536	looking for third rod (green) brought out metal detector to look
1542	placeholder rod driven into ground photo 95
1545	still looking for 3rd rod photo 96, photo 97 - red rod
1620	Field team heads back to sampling loc 605 (photo 98) w/ metal detector
1640	Field team returns
1657	leave site

JL 3/9/16

Rain on the Rain

30

Location Passaic RM 10.9 Date 3/10/16

Project / Client USEPA

940	Arrived Onsite. Helen, Patrick, Rick, Joel, Ian present
950	H&S meeting, main concern = slip trips & falls. No tent will be set up today
953	Begin processing 603 active layer photos 100-102 no signs of cracks at tip of rod, no bentness or curvature at the screen fibers photos 103 & 104
10.21	4.7, 8.9, 11.1, 10.1, 45.4, 62.3, 50.3, 31.6, 18.7, 15.9, 7.4, 36.6, 105.0, 19.4, 20.9, 128.1, 78.8, 64.5, 56.6, 99.0, 83.6, 126.7, 95.5, 104.4, 74.0, 69.7, 22.4, 47.0, 124.1
1027	Sampling fibers packed into vial (Red)
1030	Begin processing 608 Arm's Length (Photos 105 to 108) Screen is bent at the top and slits on one side have been stretched wider no cracks observed on aluminum tip (photos 109-111) and photo 112

Location Passaic RM10.9 Date 3/10/16 31

Project / Client USEPA

1103	measurement readings: 18.2, 48.6, 28.3, 10.7, 8.8, 46, 52.5, 36.1, 54.9, 18.7, 24.2, 36.5, 36.1, 12.5, 8.6, 9.3, 8.6, 9.0, 5.2, 4.1, 49.2, 17.3, 13.4, 21.5, 10.7, 4.4, 10.4, 8.4, 8.0, 9.7, 5.1, 8.8, 10.9, 7.4, 6.1, 4.7, 6.1, 7.8, 9.4, 7.8, 13.3, 40.9, 35.4, 23.7, 11.6, 7.2, 30.4, 13.6, 36.2, 10.0, 4.9, 6.7, 14.2, 10.0, 6.6, 11.9, 10.8, 6.2, 6.9, 6.3, 22.6, 3.3, 7.7, 10.3, 8.2, 19.7, 12.4, 62, 7.4, 4.4, 12.7, 6.4, 5.8
1115	samples packed into Vials 3/10/16
1116	more fibers found in aluminum foam
1118	sample measurement readings - same loc 3.6, 2.9, 5.5, 4.2, 3.3, 7.2, 11.1, 21.6, 10.9, 5.8, 5.1, 3.7, 3.6, 5.2, 4.9, 4.3, 3.8, 4.6, 5.9, 4.9, 26.7, 8.2, 3.5,
1121	sampling fibers (additional) packed into same vial
1122	Begin processing 608 active layer (yellow) Rite in the Rain

32

Location Passaic RM 10.9 Date 3/10/16

Project / Client USEPA

(Photos 113 to 116) rod bent at the top of the screen. rod was bent back to straight before fiber extraction

1142 Sampling fibers reading (Photos 117-118)
39.3, 12.6, 42.6, 6.1, 23.8, 5.1,
109.2, 12.0, 29.2, 7.3, 114.0,
48.1, 69.7, 131.5, 118.3, 84.6,
62.3, 52.9, 118.5, 117.7, 110.4

1146 Begin processing field sample blank rod (Photo 119)
Blank is fully straight no cracks inside rod is a little rusted (Photo 120)

1200 measurement fiber readings (cm):
99.2, 60.6, 5.4, 42.1, 17.9, 84.6,
75.5, 85.5, 73.3, 78.4, 80.0
81.9, 78.0, 72.6, 67.9, 93.7
62.6, 43.9, 70.6, 44.5, 116.8,

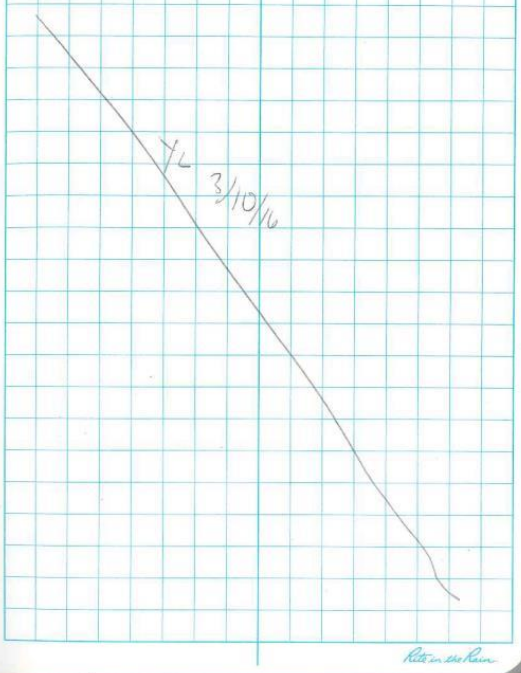
1204 End of fiber extraction process

1206 sampling fibers packed into vial

1210 Tetra Tech team is packing up equipment & supplies

1221 samples all packed into 1 cooler air bill will be printed back at the hotel

1235 leave site



Rite in the Rain

33

Location Passaic RM 10.9 Date 3/10/16

Project / Client USEPA

CONTENTS

PAGE	REFERENCE	DATE

Location LYNDHURST, NJ / PASSAIC Date 3/8/16

Project / Client USEPA - USACE / PASSAIC RM 10.9

SPME RETRIEVAL ; K. ROBERTS ES NOTETAKER

3rd ICR 3/21/16

1100 ROBERTS AND LIU ARRIVE ON SITE.
WEATHER: PARTIAL CLOUDS
LIGHT BREEZE
60°

1120 AECOM ARRIVES ON SITE. INCLUDES RICK PURDY, PATRICK FELLION, HELEN JONES, AND JEN REED.
NOTE: SEPARATE LOGBOOK FOR EPA BEING MAINTAINED BY LIU.

1150 ADDITIONAL AECOM STAFF ARRIVE ON SITE: JOEL MEUNIER, CLARE MURPHY - HEGGEM. SET UP FIELD PROCESSING STATION.

1230 PURDY CONDUCTS TAILGATE SAFETY MEETING, AECOM TO LEAVE MARKERS AT SAMPLING LOCATIONS: METAL RODS WITH SURFACE PLATE, EXTENDED 2-3 INCHES ABOVE SURFACE.

1303 START AT 0607. NO SAMPLERS VISIBLE. SAMPLERS THAT ARE PRESENT ARE BENT OVER PARALLEL TO MUDFLAT SURFACE.

Rite in the Rain

Location LYNDHURST, NJ / PASSAIC Date 3/8/16
Project / Client USEPA - USACE / PASSAIC RM 10.9
SPME RETRIEVAL

1315 COLLECT SEDIMENTS SAMPLE FROM 0607 SOFT, FLUID MUD AT 0607 ABOVE ARMOR. AECOM ALSO COLLECTS DUPLICATE SEDIMENT SAMPLE AT THIS LOCATION. NOTE "DUPLICATE" IS TAKEN FROM LOCATION OF DUPLICATE 0607 SPME LOCATION.

1330 RED FLAGGED 0607 IS PULLED OUT OF LAP AND LAYING IN MUDFLAT. SAMPLER RINSED WITH TALEN WATER BEFORE BROUGHT ON SHORE.

1340 FIBERS REMOVED FROM HENRY SAMPLER AND RINSED WITH TALEN WATER. RINSING DONE OVER CLEAN ALUMINUM TRAYS. FIBERS RETRIEVED FROM TRAY WITH TWEEZERS, AND PLACED ON CLEAN PIECE OF ALUMINUM FOIL. FIBERS MEASURED WITH CALIPER, THEN PLACED IN VIAL OF TALEN WATER. (TOOK PHOTO OF ~~MEASUS~~ KLR 3/8/16 MEASUREMENTS OF 0607 ARMOR).

1350 5 OF 6 SAMPLERS RECOVERED FROM 0607 AND 0607 DUP. NONE UNDAMAGED AND ORIENTED VERTICALLY.

Location LYNDHURST, NJ / PASSAIC Date 3/8/16
Project / Client USEPA - USACE / PASSAIC RM 10.9
SPME RETRIEVAL

1407 BEGIN PROCESSING ARMOR STONE 0607 DUP. WHILE HENRY SAMPLER IS SEVERELY BENT, THERE ARE NO ~~BRAKE~~ KLR 3/8/16 BREAKS IN ALUMINUM CASING. EXPOSED FIBERS CUT FROM HOLDER WITH EXACTO KNIFE AT TAPE LINE.

FIBER LENGTHS (mm)

11.5	23.2	104.5	16.6	15.1	9.6
18.0	60.3	11.7	6.3	140.6	29.6
14.4	71.5	20.2	26.3	35.3	33.2
34.2	7.2	12.2	35.1	35.9	33.6
92.4	62.1	54.2	18.3	128.2	127.8
99.0					

1435 BEGIN PROCESSING 0607 ACTIVE LAYER. UNABLE TO RETRIEVE FIBERS FROM HENRY SAMPLER. HENRY SAMPLER WRAPPED IN FOIL UNTIL FIBERS CAN BE USED TO HELP EXTRACT FIBERS.

1445 BEGIN PROCESSING 0607 DUPLICATE ACTIVE SEDIMENT LAYER SAMPLER. FIBER LENGTHS (mm):
15.5, 5.2, 67.8, 10.5, 4.9, 4.4, 8.9, 11.3, 6.9, 7.8, 16.6, 10.2, 4.9, 8.5, 8.5, 45.8, 41.3, 6.6, 2.4, 40.7, 14.8, 24.9, 17.5, 48.3, 6.2,

(CONT ON NEXT PAGE)

Location LYNDHURST, NJ / PASSAIC Date 3/8/16

Project / Client USEPA-USACE / PASSAIC RM 10.9

SPME RETRIEVAL

CON'T: 8.6, 21.1, 12.6, 40.0, 3.8, 5.4, 33.5, 6.6, 26.1, 29.5, 13.7, ~~100.1~~ 10.1 KLR 3/8/16, 47.6, 44.5, 49.5, 49.5, 42.7, 37.1, 34.1, 11.2, 12.6, 15.5, 22.8, 11.6, 9.1, 14.3, 72.6, 55.6, 60.5, 44.9, 40.3, 60.3, 40.3, 4.4

1535 BEGIN PROCESSING ~~0607~~ 0606 KLR 3/8/16 SEDIMENTS FIBER LENGTHS (mm): (NOTE: THIS SAMPLER IS STRAIGHT)
6.9, 8.0, 80.3, 104.8, 136.5, 105.2
71.1, 78.7, 103.9, 70.7, 38.1, 57.5
97.3, 66.9, 22.5, 40.7, 52.9, 17.3
98.8, 93.4, 74.1

1615 BEGIN PROCESSING 607 ACTIVE FROM EARLIER THAT HAD BEEN CUT BUT WRAPPED IN FOIL. FIBER LENGTH (mm): 7.4, 6.6, 10.2, 9.6, 7.9, 4.5, 17.3, 13.2, 10.2, 14.3, 18.7, 7.0, 31.9, 6.3, 8.7, 7.7, 19.0, 11.7, 14.7, 12.0, 7.0, 10.4, 8.5, 43.1, 9.1, 4.9, 8.3, 32.9, 19.0, 11.8, 29.0, 37.1, 13.7, 73.1, 23.8, 17.2, 32.6, 38.7, 15.2, 37.9, 13.9, 47.3, 40.5

1642 BEGIN PROCESSING 607 SEDIMENTS. FIBER LENGTH (mm): 5.4, 10.7, 3.6, 2.7, 3.8, 10.1, 4.1, 2.9, 4.7, 54.8, 12.1, 7.2

(CON'T ON NEXT PAGE)

Location LYNDHURST, NJ / PASSAIC Date 3/8/16

Project / Client USEPA-USACE / PASSAIC RM 10.9

SPME RETRIEVAL

CON'T: 51.1, 20.3, 14.5, 17.6, 18.8, 43.1, 60.5, 54.4, 29.3, 48.7, 41.3, 30.4, 13.8, 11.8, 24.9, 8.8, 34.8, 13.5, 42.7, 77.0, 49.0, 51.2, 70.9, 65.6, 13.5, 22.7, 51.0, 69.4, 7.7, 49.2, 52.5, 14.7, 50.3, 51.7, 6.2, 11.0, 3.7, 3.2, 3.7

1717 FINISH PROCESSING SAMPLES FOR THE DAY. THE FOLLOWING SAMPLERS WERE EXTRACTED TODAY, WRAPPED IN FOIL, AND WILL BE PROCESSED TOMORROW: 601 SEDS, ARMOR, ACTIVE; 605 SEDS, ARMOR, ACTIVE. ALL BENT IN SOME FASHION.

1730 LEAVE SITE

END OF DAY

3/8/16

Rite in the Rain

Location LYNDHURST, NJ / PASSAIC Date 3/9/16

Project / Client USEPA-USACE / PASSAIC RM 10.9

SPME RETRIEVAL; K. ROBERTS IS NOTE TAKER

0839 ROBERTS ARRIVES ON SITE.
WEATHER: CLEAR
NO BREEZE
50°

1045 AECOM ARRIVES ON SITE. SAME PERSONNEL AS YESTERDAY, INCLUDING Y. LIU (COM SMITH)

1120 R. PURDY CONDUCTS SAFETY BRIEFING.

1126 BEGIN PROCESSING 0601 SEDIMENT. SAMPLER APPEARS STRAIGHT EXCEPT FOR BENT TOP. FIBER LENGTH (mm): 7.1, 4.7, 23.0, 56.3, 62.9, 30.8, 128.5, 6.8, 107.2, 68.6, 82.7, 98.3, 88.3, 97.9, 122.7, 128.5, 107.2, 66.2, 93.4, 82.1, 93.7, 80.5

1147 BEGIN PROCESSING 605 SEDIMENT. FIBER LENGTHS (mm): 3.3, 3.2, 7.8, 4.9, 3.5, 10.5, 3.7, 4.4, 5.5, 3.5, 4.8, 6.3, 5.5, 3.2, 3.6, 4.1, 17.7, 12.6, 24.2, 38.1, 38.2, 12.7, 30.6, 13.1, 34.8, 67.3, 39.1, 16.1, 24.5, 15.8, 77.1, 16.9, 80.6, 37.1, 9.2, 22.3, 32.6, 13.3, 44.8, 5.0, 4.1, 2.8, 4.8, 4.1, 6.1, 7.2, 6.3, 2.6, 5.2, 14.8, 7.7, 3.8, 4.5. SAMPLER WAS

(CON'T ON NEXT)

Location LYNDHURST, NJ / PASSAIC Date 3/9/16

Project / Client USEPA-USACE / PASSAIC RM 10.9

SPME RETRIEVAL

CON'T: STRAIGHT, EXCEPT BENT AT TOP.

1235 BEGIN PROCESSING 605 ARMOR. SAMPLER BENT AT TOP. ISSUE WITH TAPE NOT HOLDING FIBERS TO ALUMINUM INSERT (HAS HAPPENED ON SOME OTHER SAMPLERS). FIBER LENGTHS (mm): 15.1, 127.9, 45, 79.7, 28.9, 24.7, 72.7, 81.2, 47.2, 21.9, 32.3, 109.3, 16.9, 26.4, 102.2, 66, 21.9, 9.4, 28.4, 20.9, 10.7, 4.8, 5.5, 9.9, 8.1, 19.9, 31.3, 19.9, 14.4, 21.3

1320 BEGIN PROCESSING 0605 ACTIVE SAMPLER BENT IN "U" SHAPE AND WAS LAYING ON MUD SURFACE (PER AECOM). FIBER LENGTHS (mm): 8.3, 4.5, 6.8, 29.5, 22.2, 11.7, 92.0, 10.1, 39.1, 43.6, 69.6, 22.3, 7.8, 6.1, 92.2, 75.2, 23.4, 31.7, 26.4, 13.0, 22.9, 6.3, 11.3, 8.9, 15.7, 8.9, 14.5, 13.7, 2.7, 6.3, 7.1, 92.8, 30.7, 8.9, 59.9, 10.6, 44.0, 13.1, 11.1

1408 BEGIN PROCESSING 601 ARMOR. IT IS ASSUMED TO BE ARMOR LAYER BASED ON LENGTH OF SAMPLER AND ORIENTATION. NOTE: HENRY SAMPLER WAS MISSING SWAGELOCK AND BENT.

Rite in the Rain

10

Location LYNDHURST, NJ/PASSAIC Date 3/9/16

Project / Client USEPA-USACE/PASSAIC RM 10.9

SPME RETRIEVAL

1410 601 ARMOR FIBER LENGTHS (mm):
84.4, 35.5, 5.4, 6.5, 5.6, 35.4, 17.3,
10.7, 7.7, 4.5, 3.3, 2.5, 81.3, 11.8,
4.6, 95.8, 87.6, 9.2, 8.3, 5.5, 4.9,
6.6, 3.3, 6.5, 100.3, 102.9, 103.4,
8.9, 129.8, 5.6, 21.0, 5.3, 5.6, 6.5,
9.2, 14.4, 13.9, 6.9, 10.2, 5.1, 3.5, 4.7,
5.2, 4.7, 6.1, 36.3, 1.8

1443 BEGIN PROCESSING 601 ACTIVE,
SAMPLER BENT. FIBER LENGTHS (mm):
25.6, 50.9, 14.4, 19.8, 14.1, 19.2, 6.6, 7.2,
4.4, 6.0, 5.6, 7.9, 24.9, 7.4, 3.6, 5.0, 4.4,
42.1, 22.8, 13.1, 13.5, 23.3, 89.8,
20.1, 25.9, 39.2, 13.2, 13.4, 24.4, 7.0,
67.4, 65.0

1519 TWO 604 SAMPLERS RETRIEVED, BUT UNABLE TO LOCATE ONE OF THE SAMPLERS. TWO SAMPLERS ARE STRAIGHT.

1521 ADDITIONAL FIBERS FOUND IN 601 ACTIVE SAMPLER. FIBER LENGTHS (mm):
8.5, 2.9, 4.3, 26.3, 23.3, 26.7, 10.1, 6.9,
15.5, 14.8, 63.1, 13.4, 56.1, 99.2, 39.2, 37.2
31.0, 28.2, 8.4, 8.0, 3.6, 4.1

Location LYNDHURST, NJ/PASSAIC Date 3/9/16

11

Project / Client USEPA-USACE/PASSAIC RM 10.9

SPME RETRIEVAL

ICCE 3/9/16

1541 BEGIN PROCESSING 603 604 SEDIMENT. SAMPLER IS STRAIGHT. FIBER LENGTH (mm):
30.1, 15.7, 20.4, 21.9, 13.9, 33.5, 85.2,
7.4, 104.1, 17.8, 4.9, 6.1, 101.3, 52.6,
65.7, 43.9, 43.0, 55.8, 17.7, 117.2,
115.9, 57.4, 34.7, 95.1, 72.7, 60.9

1613 BEGIN PROCESSING 604 ACTIVE. SAMPLER RELATIVELY STRAIGHT. FIBER LENGTH: 4.7, 5.7, 6.7, 11, 16.8, 23.6,
90.9, 75.1, 51.9, 27.7, 30.6, 31.1, 14.3,
99, 76.8, 95.4, 80.4, 76.1, 109.2, 8.6,
21.4, 105.5, 99.2 mm

1638 BEGIN PROCESSING 603 SEDIMENT. SAMPLER IS STRAIGHT. FIBER LENGTHS (mm):
4.0, 3.3, 5.1, 4.4, 4.2, 4.0, 5.5, 19.5,
5.4, 20.7, 6.7, 6.1, 10.1, 7.8, 5.4, 3.8,
10.9, 11.8, 5.4, 4.1, 6.3, 25.2, 23.2,
29.5, 24.3, 36.7, 36.2, 46.3, 41.0,
35.8, 45.3, 93.3, 71.8, 14.7, 8.3, 25.0,
16.7, 6.6, 21.5, 4.8, 5.8, 11.2, 12.3,
14.2, 14.4, 21.6, 54.1, 21.1, 21.9,
19.7, 18.5, 22.6, 15.3, 8.8, 5.6,
96.4, 93.4, 85.4,

1729 BEGIN PREPPING 608 SEDIMENT

Rita in the Rain

12

Location LYNDHURST, NJ / PASSAIC Date 3/9/16

Project / Client USEPA-USACE / PASSAIC RM 10.9

SPME RETRIEVAL

1730 608 SEDIMENT SAMPLER IS STRAIGHT. FIBER LENGTH (mm):
10.6, 4.4, 7.9, 6.3, 7.0, 7.8, 11.6,
12.7, 5.4, 8.0, 6.9, 4.2, 12.3, 5.9,
12.1, 3.6, 13.1, 9.9, 5.7, 10.5, 10.9, 6.0,
10.8, 8.7, 8.4, 8.3, 7.6, 7.5, 9.4, 4.3,
11.1, 6.7, 5.5, 10.5, 4.3, 6, 4, 4.5, 5.0,
3.8, 5.2, 10.8, 5.3, 4.2, 3.1, 4.6, 2.8,
3, 4, 4.2, 9.4, 7.2, 11.4, 8.3, 13.2, 8.4,
10.2, 18.4, 26.6, 23.6, 26.1, 17.5, 34.8,
28.6, 19.4, 36, 9.3, 36.8, 29.6, 31.9,
27.3, 28.8, 28.5, 15.4, 10.4, 15.5,
34.3, 26.8, 82.9, 82, 15.1, 10.4,
11.5, 6.7, 11.0, 6.0, 4.9, 4.6, 11.7, 17.0,
5.6, 13.9, 6.0, 10.7, 8.2, 19.6, 19.1, 10.3,
25.1, 26.6

1815 ROBERTS LEAVES SITE.

END OF DAY

Keegan 3/9/16

13

Location _____ Date _____

Project / Client _____

Rite in the Rain